CLAIMS

1. A workpiece holding method comprising the steps of:

dispensing a first radiation responsive adhesive on a fixing surface of a fixture;

positioning a workpiece adjacent to the fixing surface;

interposing the first radiation responsive adhesive between the fixing surface and the workpiece;

exposing the first radiation responsive adhesive to a first predetermined level of radiant energy for a first predetermined time period sufficient to cure the first radiation responsive adhesive and to form an adhesive bond between the workpiece and the fixing surface,

whereby the workpiece and the fixture are interconnected.

2. The method according to claim 1 for separating the workpiece from the fixture after being interconnected further comprising the step of exposing the adhesive bond to a second predetermined level of radiant energy for a second predetermined time period sufficient to structurally weaken the adhesive bond between the workpiece and the fixture, whereby the workpiece and the fixture are disconnected.

3. The method according to claim 2 further comprising the step of removing any residual adhesive substrate from the fixing surface.

4. The method according to claim 2 further comprising the step of removing any residual adhesive substrate from the workpiece.

5. The method according to claim 1 further comprising the steps of:

dispensing a second radiation responsive adhesive on the workpiece;

curing the second radiation responsive adhesive on the workpiece to a semi-cured state; and

bringing the workpiece having the semi-cured second radiation responsive adhesive into contact with the first radiation responsive adhesive on the fixing surface.

6. The method according to claim 1 further comprising the step of dispensing a light absorbent radiation responsive adhesive on the first radiation responsive adhesive.

7. The method according to claim 1 wherein the first radiation responsive adhesive includes a light absorbent additive.

8. An adhesive work holding system for securing a workpiece for manufacturing comprising:

a fixture having a radiation transmittive fixing surface;

a radiant energy delivery system being capable of emitting radiant energy;

said radiant energy delivery system being located adjacent to and in optical communication with said radiation transmittive fixing surface; and

said radiation transmittive fixing surface is capable of transmitting said radiant energy emitted by said radiant energy delivery system.

9. The system according to claim 8, wherein

said radiation transmittive fixing surface is capable of transmitting electromagnetic radiant energy; and

said radiant energy delivery system is capable of emitting electromagnetic radiant energy.

10. The system according to claim 8, wherein
said radiation transmittive fixing surface is capable of transmitting electron beam radiant energy; and
said radiant energy delivery system is capable of emitting electron beam radiant energy.

11. The system according to claim 8, wherein said radiation transmittive fixing surface is made of material selected from the group consisting of sapphire, diamond, single crystal silicon dioxide, ruby, cubic zirconia, and zirconium oxide.

12. The system according to claim 8 wherein said radiant energy delivery system comprises a radiant energy source and network of optical channels.

13. The system according to claim 12 wherein said network of optical channels is integral to said fixture.

14. The system according to claim 13 wherein:
said network of optical channels comprise an input end and output end;
said output end being located adjacent to said radiation transmittive fixing surface;
said input end being located adjacent to said radiant energy source; and
said radiant energy source being capable of emitting radiant energy.

15. The system according to claim 14, wherein said output end of said network of optical channels is capable of transmitting to

said radiation transmittive fixing surface a stationary beam of radiant energy generated by said radiant energy source.

16. The system according to claim 14, wherein:

said radiant energy delivery system further comprises a radiant energy directional source in optical communication between said network of optical channels and said radiation transmittive fixing surface; and

said radiant energy directional source being capable orienting the radiant energy transmitted by said network of optical channels on to said radiation transmittive fixing surface.

17. The system according to claim 12 wherein said radiant energy source is capable of transmitting radiant energy in a wavelength range between 300 nm and 1064 nm.

18. The system according to claim 12 for bonding the workpiece to said radiation transmittive fixing surface wherein said radiant energy source is capable of transmitting radiant energy in a wavelength range approximately between 300 nm and 550 nm.

19. The system according to claim 12 for separating the workpiece from said radiation transmittive fixing surface wherein said radiant energy source is capable of transmitting radiant energy in a wavelength range approximately between 600 nm and 1064 nm.

20. The system according to claim 8 wherein said fixture further comprises:

mechanical locators to position the workpiece relative to said fixture; and

said mechanical locators defining a predetermined gap between the workpiece and said radiation transmittive fixing surface.

21. The system according to claim 20 wherein said mechanical locators are capable of being disengaged, whereby said mechanical locators do not interfere with the manufacturing.

22. The system according to claim 20 wherein said mechanical locators are capable of being removed, whereby said mechanical locators do not interfere with the manufacturing.

23. The system according to claim 20 wherein said mechanical locators are capable of being retracted, whereby said mechanical locators do not interfere with the manufacturing.

24. The system according to claim 12 wherein said network of optical channels are selected from the group consisting of internally reflective light guides, reflective members, mirrors, and lenses.

25. A radiant energy responsive adhesive composition comprising:
a substantially clear radiation responsive structural adhesive having an index of refraction of approximately 1.5 and ranging from 99% to 99.9% by weight; and
a colorant ranging from 0.1% to 1% by weight.

26. The adhesive according to claim 25 wherein:
said substantially clear radiant responsive structural adhesive is approximately 99.5% by weight; and
said colorant is carbon black being approximately 0.5% by weight.

27. A method to produce radiant energy responsive adhesive composition comprising the steps of:

providing a substantially clear radiation responsive structural adhesive having an index of refraction of approximately 1.5 and ranging from 99% to 99.9% by weight;

providing a colorant ranging from 0.1% to 1% by weight; and

mixing the colorant with the substantially clear radiation responsive structural adhesive.

28. A method to produce radiant energy responsive adhesive composition comprising the steps of:

providing a substantially clear radiant responsive structural adhesive is approximately 99.5% by weight;

providing a colorant being approximately 0.5% by weight; and

mixing the colorant with the substantially clear radiation responsive structural adhesive.

29. A product as made by the process of claim 27.

30. A product as made by the process of claim 28.

31. The system according to claim 8 wherein:

said radiation transmittive fixing surface and said radiant energy delivery system are integral; and

said integral radiant energy delivery system comprises,

a sealed load-bearing bulb made of material selected from the group consisting of sapphire, diamond, single crystal silicon dioxide, ruby, cubic zirconia, and zirconium oxide;

electrodes disposed within said sealed load-bearing bulb;

a gas capable of emitting radiant energy in a wavelength range between 300 nm and 550 nm disposed within said sealed load-bearing bulb; and

a plurality of electrical wires connected to said electrodes.